

ALTERNATIVES TO TAXONOMIC HIERARCHY: THE SAHAPTIN CASE

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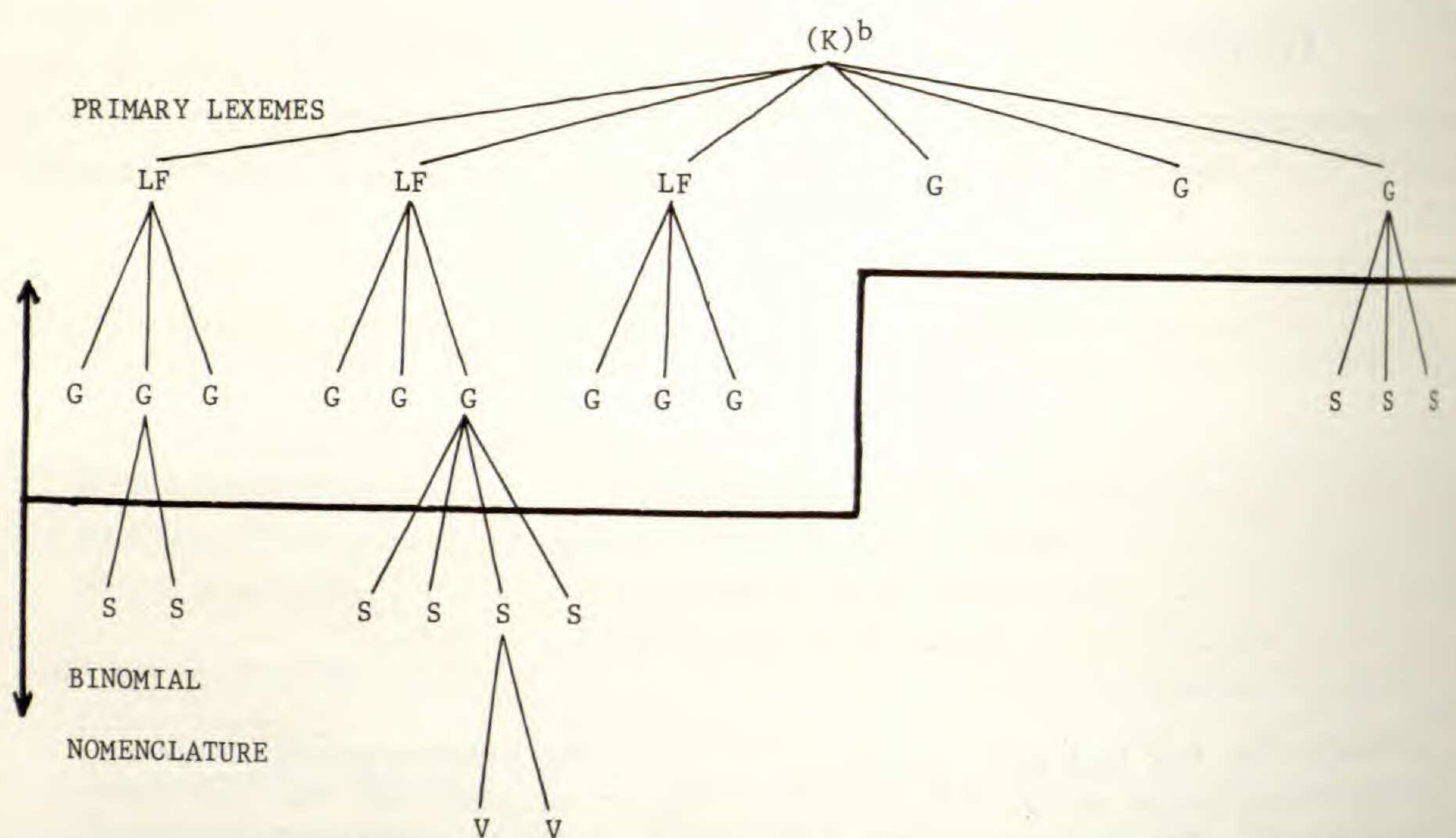
ABSTRACT.—The folk biological classification system of the Sahaptin-speaking Indians, a hunting-gathering people of the Columbia River Plain, is compared with other well documented systems. The Sahaptin system is notable for its lack of taxonomic hierarchy, especially in the rarity of binomial names. Such names imply taxonomic *subordination* of the binomially labeled taxon. Sahaptin speakers more frequently employ complex names which employ *coordination* of core and conceptually related peripheral taxa. An inventory of such names from one Sahaptin dialect group is analyzed. Explanations for the lack of hierarchy in Sahaptin folk biological classification and nomenclature are discussed. An evolutionary/functional explanation based on the relative sizes of the folk biological domains of hunter-gatherers versus subsistence agriculturalists is preferred.

INTRODUCTION

Studies of folk biological classification begin with the matching of names to corresponding segments of the biota. Since they do not end there, the next step is to seek to discover and analyze the organizing principles that structure these systems, which may then be compared cross-culturally.

Berlin's universal principles of folk biological classification and nomenclature (1973; Berlin, Breedlove, and Raven 1973), though based on limited comparative data, represent a pioneering effort at such cross-cultural analysis, and provide the framework for most subsequent studies of the structure of folk biological classification systems. His proposals have been supported (e.g., Brunel 1974; Hays 1974, 1983; Hunn 1975), extended (Brown 1977; Brown et al. 1976), criticized (e.g., Bulmer 1974; Hays 1983; Healey 1978-79; Hunn 1976, 1977; Randall 1976), and revised (Berlin 1976). This paper is intended as both critique and extension of Berlin's point of departure. We will argue that the taxonomic principle of inclusion by which taxa at one level or rank are subsumed by those of a higher level or rank—basic to Berlin's hierarchic scheme of folk biological classification, as it is to the Linnean—is but *one* way to organize a set of folk biological taxa. Furthermore, the associated binomial naming principle is one of several ways to indicate nomenclaturally structural relationships within folk biological classification systems (Fig. 1).

Our research with Sahaptin-speaking Indians of the Columbia Plateau region of the Pacific Northwest (Fig. 2) has shown Sahaptin to be an unusual case in comparison with folk biological classification systems previously described. Plant and animal classification by our Sahaptin-speaking consultants exhibits an extraordinary lack of hierarchic structure (French 1981). In fact, the system closely approximates the null point of taxonomic hierarchy, the single level system. Berlin has postulated that such a system should represent the initial stage in an evolutionary sequence of development of folk taxonomies (1972).



^aLF = life forms, G = folk generics or basic level taxa, S = folk specifics, V = folk variants, based on Berlin, Breedlove, and Raven (1973).

^bThe kingdom (K) rank is typically not named.

FIG. 1.—Idealized taxonomic structure indicating the relationship between taxonomic levels and ranks and showing the distribution of binomial nomenclature.^a

Following Berlin's lead, Brown (1977, 1979) sought to demonstrate that named life form taxa, i.e., inclusive taxa at a level above that of the basic folk taxonomic level (the "folk generic" rank of Berlin), are added progressively to the folk biological inventories of the world's languages. Sahaptin is at an early stage of development, according to Brown's analysis, having a single botanical and a single zoological life form named, i.e., 'tree' and 'bird'. Of 217 cases sampled by Brown, only six are judged to have as few (5 cases) or fewer (one case) life forms (1977:324, 1979:796).

The minimal degree of hierarchic development in Sahaptin is even more apparent when Berlin's folk specific taxonomic level is considered. Berlin has compared a number of well documented folk botanical and zoological systems in terms of the percent of "folk generic" taxa subdivided by subordinate "folk specific" taxa, to which binomial names are characteristically applied (1976:389). These and an additional case are summarized in Table 1. There is a surprising degree of consistency to these statistics, with all except the Hanunóo falling in the range of 11% to 18% of basic level taxa being polytypic. Sahaptin stands in sharp contrast. The frequency of basic level polytypy for plant taxa is 1% (excluding recent coinages), with only two cases known, while that for animals is 2%, with four cases known.

It is misleading, however, to conclude that Sahaptin-speakers fail to perceive structure within their biological domains. Furthermore, they use nomenclatural means to indicate the structure they perceive, just as the use of binomial names may indicate relations of taxonomic hierarchy. We will describe two regular nomenclatural patterns employed in Sahaptin to indicate relationships among folk biological taxa. Both are more frequently employed than is binomial naming in Sahaptin folk biology. Both patterns reflect perceived resemblance or "kinship" among taxa. These relations coordinate taxa in direct contrast (cf. Lancy and Strathern 1981) rather than subordinate less inclusive taxa to those more inclusive.

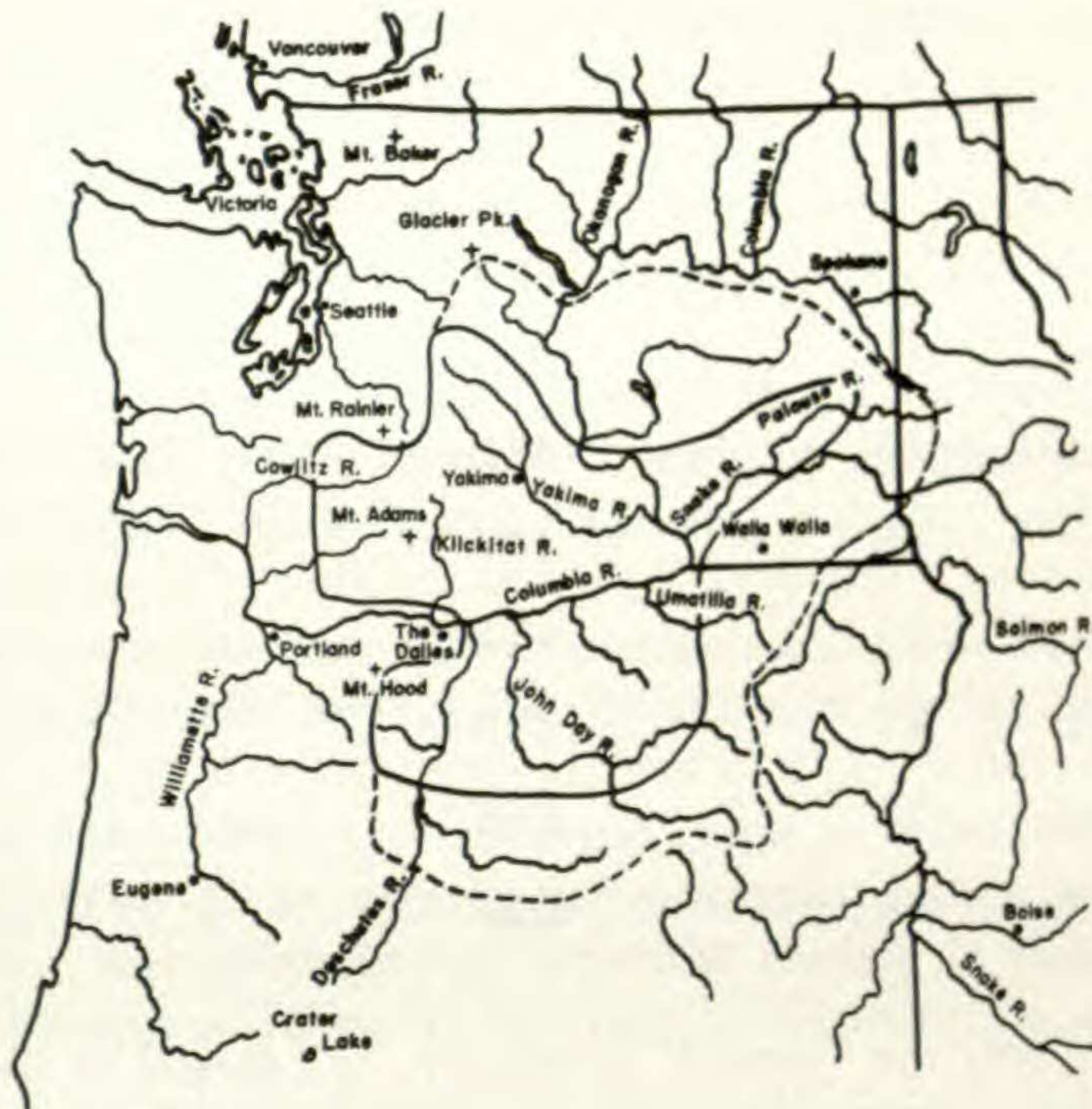


FIG. 2.—Map of the Pacific Northwest showing territory utilized by Sahaptin-speaking peoples. The central area indicates territory used primarily by Sahaptin-speaking peoples and under their control. The peripheral area indicates territory used annually by Sahaptin speaking peoples but in common with neighboring groups of other linguistic affiliations. Both areas are approximate. Reproduced from page 22 of Eugene S. Hunn, "Mobility as a Factor Limiting Resource Use in the Columbia Plateau of North America," pp. 17-43 in *Resource Managers: North American and Australian Hunter-Gatherers*, A.A.A.S. Symposium Volume 67, Westview Press, Boulder, Colorado.

Sahaptin speakers are much less likely to name a taxon by reference to its relationship to some other taxon—whatever the nature of that relationship—than speakers of other well known languages. The percentage of basic taxa named by reference to such relations in Sahaptin is substantially less than the percentage of binomially named taxa alone in comparable systems.

METHODS OF DATA COLLECTION AND ANALYSIS

In the Sahaptin case, we have consulted a variety of sources: 1) the naming responses of Sahaptin-speaking consultants to individual plants and animals examined in

TABLE 1.—Degree of basic level polytypy in folk biological systems.

System	Polytypy %	Number of Basic Level Taxa	Source
Sahaptin plants	1	213	Hunn 1980
Sahaptin animals	2	236	Hunn 1980
Chacan Quechua plants	11	n.a.	Brunel 1974
Ndumba plants	14	385	Hays 1974a
Ndumba animals	16	186	Hays 1983a
Tzeltal Mayan plants	16	471	Berlin, et al. 1974
Tzeltal Mayan animals	17	335	Hunn 1977
Aguaruna Jivaro plants	18	566	Berlin 1976
Hanunóo plants	36	n.a.	Conklin 1954

a These numbers represent the “shared” inventory, i.e., shared by nine of Hays’ 10 informants. His totals are thus conservative compared with those reported by other researchers, who list a collective inventory.

situ or as pressed specimens, 2) discussions with consultants (conducted in English) of the characteristics of plants and animals (named in Sahaptin), and 3) comparable data reported by colleagues (K. French, V. Hymes, B. Rigsby, H. Schuster) and earlier ethnographers and linguists (M. Jacobs, E. Curtis, M. Pandosy, W. Everette). These data are of diverse quality. However, in the aggregate they represent several thousand instances of the naming of plant and animal taxa.

The key methodological issue is the operational definition of a *name*. In particular, names must be distinguished from more ephemeral constructions such as descriptive phrases, nonce forms, and idiosyncratic labels. Though a name may be constructed of two or more words, it is a single *lexeme* (Conklin 1962), that is, the referential meaning of the lexeme is not readily inferred from the referential meanings of its component morphemes or words. Thus, “silverfish” is not a silver fish and a “blackbird” is not just any bird which is black. For present purposes, a name must also reflect some degree of *consistency* of application across individuals and naming events. We have established the criterion for our data that to be considered a name a lexical expression must be employed consistently by at least two individuals on at least two independent occasions with the same referential meaning. This criterion is conservative in that it no doubt has led to the exclusion of some names from the corpus here considered. However, it provides a systematic means to exclude many (perhaps not all) nonce forms. This criterion is a necessary but not a sufficient condition for a lexical response to be considered a name. Expressions must also be considered appropriate responses to the query, “What is the name of X?” In Sahaptin this is *tun i-waník-ša*.²

Sahaptin speakers are quite emphatic in denying the status of “name” (*waník-t*) to responses considered to be transparently descriptive. It seems to us that this emic distinction is identical to or closely parallel to the linguists’ distinction between noun lexemes and polylexemic expressions (Lyon 1977: Vol. 1, 18-25; Taylor 1982). We have also queried consultants about each named taxon concerning uses, distributional patterns, and morphological and behavioral features. When consultants are able to provide detailed

ancillary information about a named organism, we feel justified in concluding that the name indeed refers to a distinct concept, a "semantically primitive" kind of living thing.

We are also concerned here with a particular class of names, that is, those which indicate syntactically a formal or structural relationship between the taxon named and some related folk biological taxon. Such *structure-defining names* necessarily will be morphologically compound and thus particularly difficult to distinguish from lexically compound expressions of parallel syntactic composition. English structure-defining names are typically (if not exclusively) of binomial form, as for example, "big-leaf maple" and "hammer-head shark." The binomial form of these names consistently indicates that the taxon so named is subordinate to the taxon named by the head constituent of the name. Such names must be carefully distinguished from descriptive phrases, such as "moss-draped maple" and "man-eating shark," and from metaphorical look-alikes such as "poolshark," "poison oak," and "silverfish," already mentioned.

Parallel naming conventions have been described for a number of languages unrelated to English, and the binomial pattern may be universal (Berlin, Breedlove, and Raven 1973). The lexemic typology devised by Conklin (1962), since refined by Berlin (1973), recognizes the binomial name form as of privileged status, and the class inclusion relations indicated thereby have come to be seen as *the* fundamental structural principle of folk biological classification. The generality of binomial naming in folk biological nomenclatural systems, plus its incorporation as the basis of scientific biological nomenclature, has obscured the fact that this naming convention is just one of several naming patterns indicative of structural relations among taxa.

In Sahaptin there are *three* nomenclatural patterns commonly used to reflect *two* distinct types of formal relations among taxa. Binomial nomenclature used to indicate class inclusion is one of these. More frequently used in Sahaptin are two other naming patterns. These latter indicate relations of coordination—a relationship sometimes referred to metaphorically by Sahaptin consultants in terms of human social or kinship relations, as for example, dog, coyote, and wolf are said to be *náymu* 'relative/friend' of one another.

One of these coordinating naming patterns is superficially binomial, in that the name is formed of the modified name of a second taxon, which remains unaltered as the head constituent. The attributive constituent is the bound suffix-*wáakut*, which may be glossed 'resembling' or, simple '-like'. For example, *c'itawáakut* is used to name Belding's ground squirrel (*Citellus beldingi*), while *c'itá* [*c'ii* (onomatopoetic) + *-á* (agentive)] names Townsend's and Washington ground squirrels (*C. townsendii*, *C. washingtoni*). Consultants who used this name (one each from the John Day and Umatilla dialects) distinguish Belding's on the basis of size, calls, and range. The suffix *-wáakut* is also frequently employed to indicate similarity in a descriptive context, as when the color of a horse is described as *wiwnuwáakut* 'huckleberry-like'.

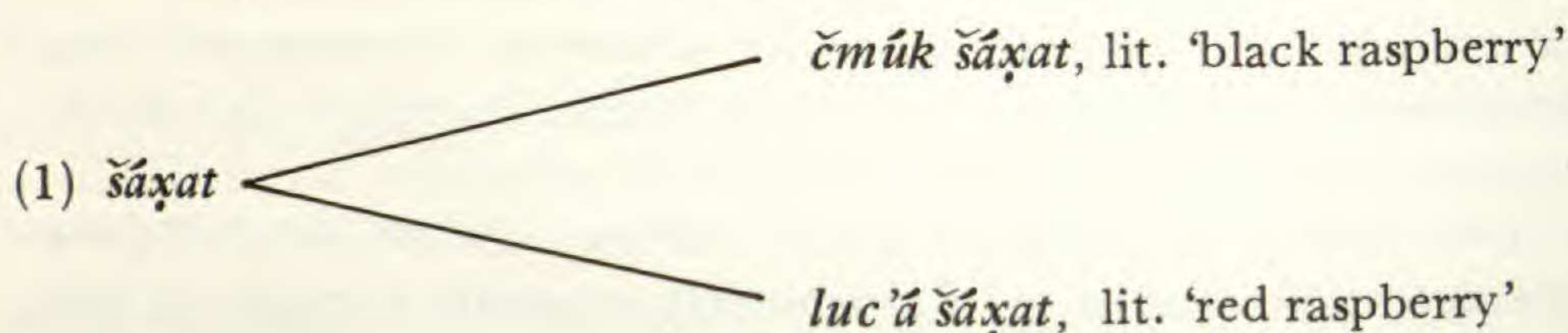
The second Sahaptin syntactic convention used in coordinate naming is reduplication, often combined with sound symbolism. This is a highly productive syntactic feature of Sahaptin (Jacobs 1931:135-140; Rigsby n.d.) indicating variously diminution, distributive plurality, and—as here—the status of "younger sibling," i.e., the resemblance of a conceptually peripheral taxon to the more central or salient prototype. For example, *k'usík'usi* 'dog' is derived by this process from *k'úsi* 'horse'. This naming process is not restricted to recently introduced species such as the horse; it is also used, for example, in naming a species of *Vaccinium* that is a traditionally favored food item, *wiwlúwiwlu* 'grouseberry' (*Vaccinium scoparium* Leiberg)³, derived from *wiwnu* 'black mountain huckleberry' (*V. membranaceum* Dougl. ex Hook.), the archetypical fruit for Sahaptin speakers.

Such relations of coordination of similar plants and animals may be described in English (or in other languages including Tzeltal), but such descriptive expressions as

“dog-like” in English or “*kol pabaluk sok šuš*” ‘almost the same as wasp’ in Tzeltal are never used as names. The status of the parallel Sahaptin forms as true names is suggested by the fact that the nonce form *wiwluiwluwáakut* has been recorded (in response to an ambiguous *Vaccinium* specimen), as has the binomial *tanán sit'x^wswáakut*, literally, ‘Indian corn’, from *tanán* ‘Indian’, plus *sit'x^ws* ‘*Brodiaea hyacinthina* (Lindl.) Baker’, plus *-wáakut* ‘-like’.

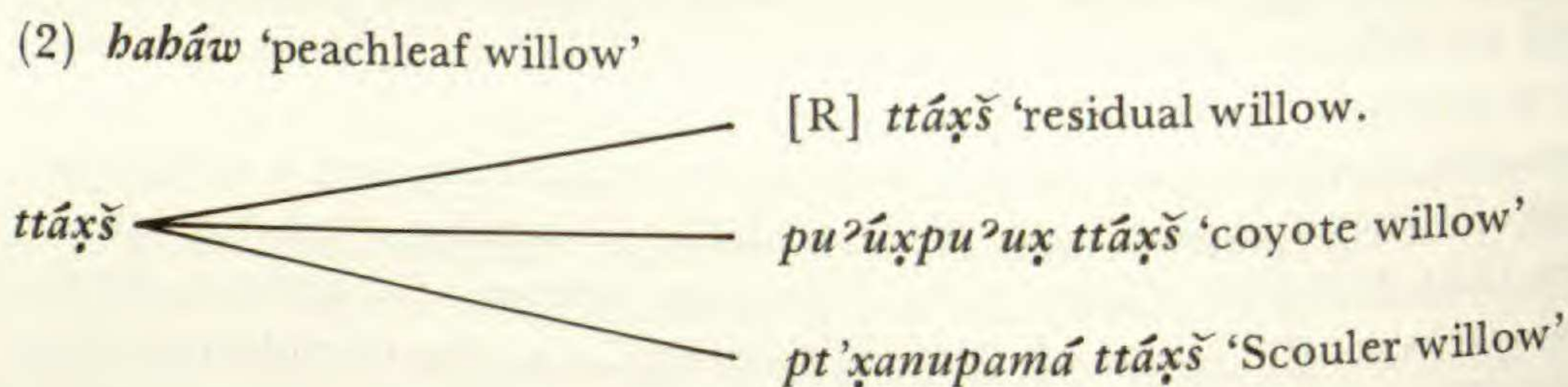
A DISCUSSION OF THE SAHAPTIN CASES

Binomial Names.—The Sahaptin use of binomial nomenclature is sporadic, at best, and at times appears to be actively avoided. One simple case of binomial nomenclature involves the recognition of two species of raspberry:



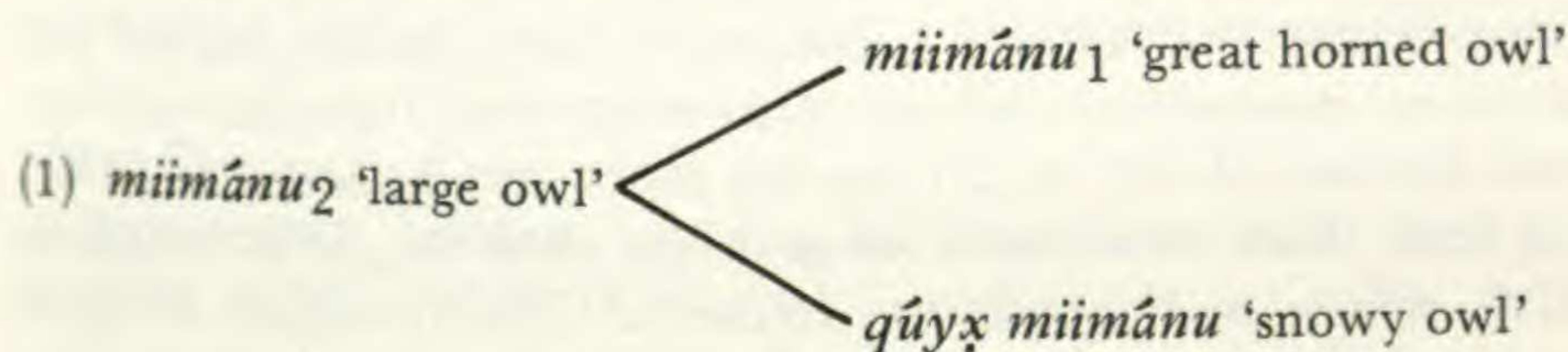
Since the red raspberry (*Rubus idaeus* L.) is rare in the Sahaptin range, the unmodified generic term *šáxat* is normally used to label the common blackcap raspberry *R. leucodermis* Dougl.) (cf. Curtis 1911:175).

The naming and classification of willows (*Salix* spp.) in Sahaptin is complex. The general term is *ttáxš* (*táxš* in NW dialects). However, the large, erect peachleaf willow (*S. amygdaloides* Anderss.) is singled out as *babáw*. It is unique among the willows in its straight, nearly branchless bole (Peattie 1950:346-347), and thus is favored for long-house framing. The categories *babáw* and *ttáxš* are seen as closely related but distinct taxa. Other native willows (e.g., *Salix exigua* Nutt. ssp. *exigua* var. *exigua*, *S. rigida* Muhl. var. *mackenzieana* (Hook.) Cronq., *S. scouleriana* Barratt, *S. lasiandra* Benth. var. *caudata* (Nutt.) Sudw.) as well as the introduced willows (*S. alba* L. var. *vitellina* (L.) Stokes, *S. babylonica* L.) are *ttáxš*. This term may be modified, though without great consistency, as *pu'úxpu'ux ttáxš* ‘gray willow’, often used to refer to the shrubby, gray leaved coyote willow (*S. exigua*), and *pt'xanupamá ttáxš* ‘mountain-forest willow’ for Scouler willow (*S. scouleriana*), the typical large willow of the montane zone. Other willows are “just” *ttáxš* ‘willow’, which creates a “residual category” (Hunn 1977:57-58), labeled [R] in the diagram below.



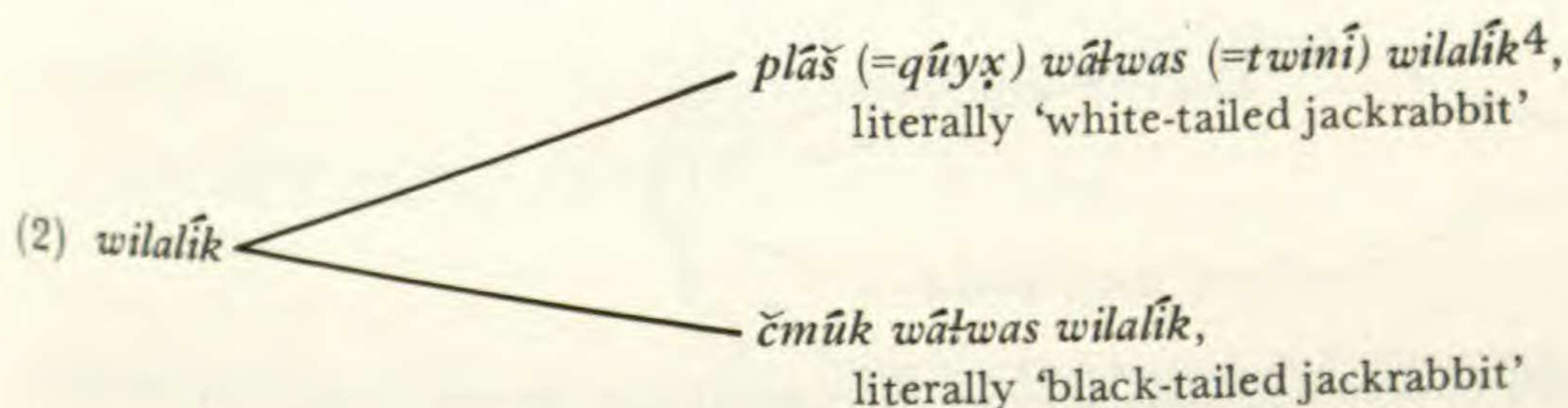
Chokecherry (*Prunus virginiana* L. var. *demissa* (Nutt.) Torr.) provides an interesting comparison. Chokecherries are an important traditional food. The cherries vary in color from red to black, but discontinuously so that three color types are readily recognized. Modern-day Sahaptins are aware of this variation but refused to apply binomials to label the variants, even when prodded to do so. Several consultants rejected **čmúk tmšš*, literally ‘black chokecherry’ and **luc'á tmšš* ‘red chokecherry’, while accepting the parallel raspberry names. They asserted that this variation among chokecherries is of no significance.

The four acceptable examples of binomial naming applied to animals are neither very widely nor very consistently used. Two informants distinguished the rare snowy owl (*Nyctea scandiaca*) as *qúyɣ miimánu*, literally, 'white large owl'. Unmodified *miimánu* calls to mind as prototype the great horned owl (*Bubo virginianus*), the most common and the most powerful owl in the region. This is attested by consultants' descriptions of *miimánu* vocalizations, appearance, and habits. The term *miimánu* is now also extended to other medium to large owls, such as the barn owl (*Tyto alba*) and short-eared owl (*Asio flammeus*), when examples of these species are presented for naming. This may indicate that contemporary speakers have never learned the "proper" names for these owls. Although this naming pattern might suggest that the snowy owl is considered a kind of great horned owl, such is not the case. The snowy owl is seen as a related, but coordinate form, on the same taxonomic level as *miimánu*. The situation might be interpreted taxonomically if we were to posit two polysemous senses of *miimánu* (cf. Berlin 1976:391-392), as follows:



However, this interpretation is hypothetical, Snowy Owl illustrations were never identified as unmodified *miimánu* (and their rarity prevented evaluation of naming responses in more realistic settings), and in the single myth recorded in which Snowy Owl is a character the binomial expression was used exclusively. Thus it is not possible to determine if *qúyɣ miimánu* is more like the English "pack rat" (a kind of rat) than "musk rat" (which is not a kind of rat).

Several consultants distinguish black-tailed jackrabbits (*Lepus californicus*) from their white-tailed cousins (*L. townsendii*).

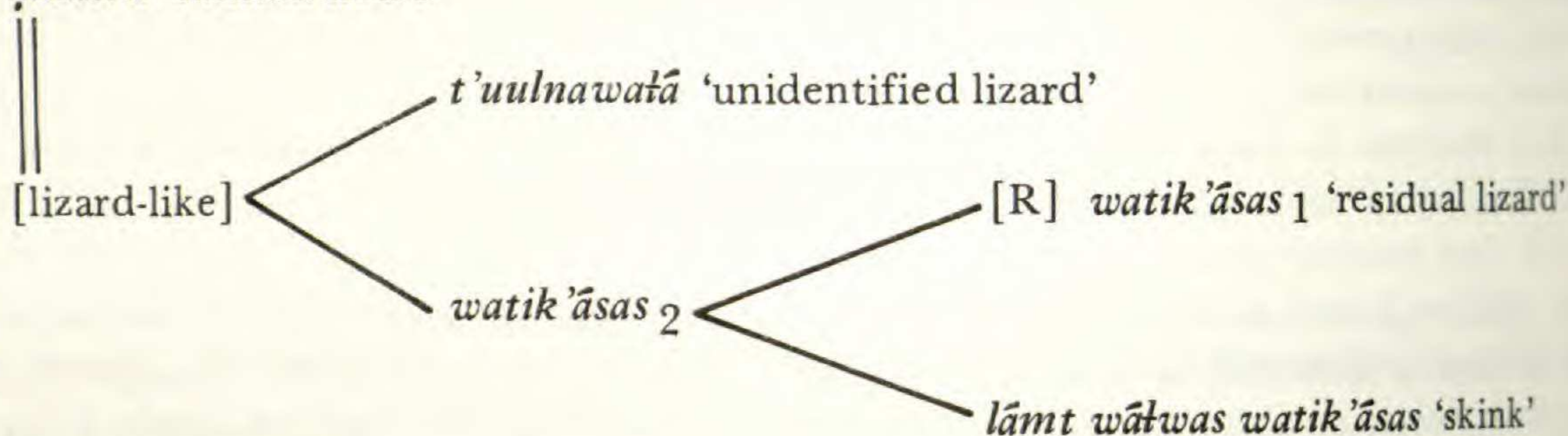


State of Washington consultants are quick to note that the black-tailed species is a modern-day intruder, having expanded its range north of the Columbia River in the past 60 years. In Oregon, where both species are longtime residents, Sahaptin speakers "mark" the less common white-tailed jackrabbit as *qúyɣ twini wilalík* in contrast to the black-tailed jackrabbit, known simply as *wilalík*.

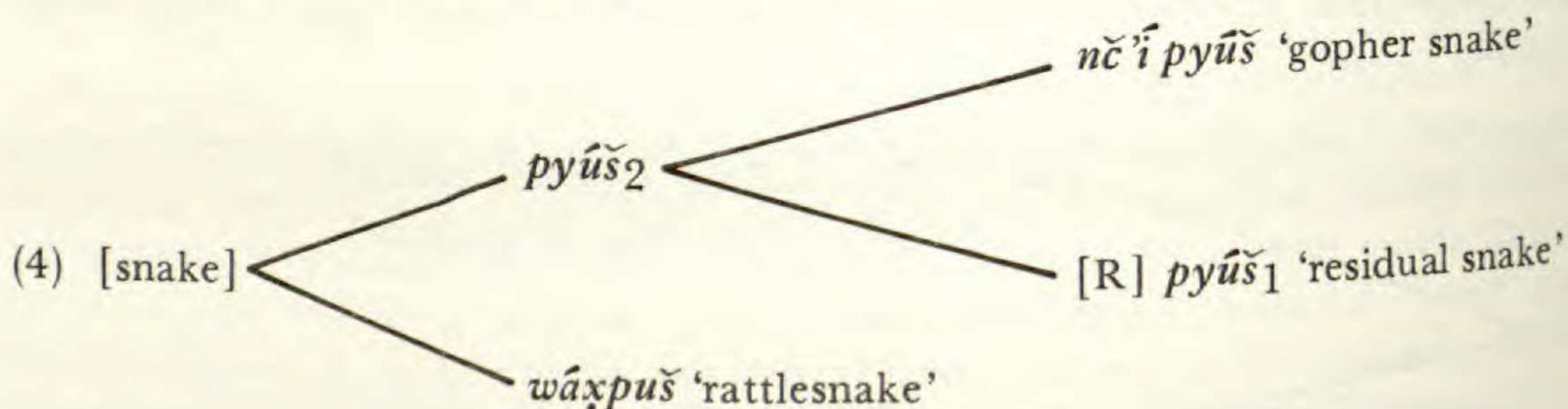
Typical lizards are called *watik'ásas*, a name which applies with equal force and without modification to fence lizards (two species of *Sceloporus*), and the side-blotched lizard (*Uta stansburiana*) [and possibly alligator lizards (two species of *Gerrhonotus*)]. The western skink (*Eumeces skiltonianus*) was singled out as *lāmt wátwas watik'ásas*, literally, 'blue-tailed lizard', by two consultants from contrasting dialect groups. The skink's tail is used as a good luck charm in gambling. Two lizards are not included in *watik'ásas*, but are contrasting basic level taxa: *xlitáwit*, literally 'of root diggers', is the shorthorned lizard (*Phrynosoma douglassi*), and *t'uulnawatā*, literally 'jumper', is of uncertain identity.⁵ Both are morphologically divergent species. Though *t'uulnawatā* is clearly thought of as a lizard-like creature, the horned lizard (n.b., "horned toad" in

colloquial English) is not. The horned lizard is in addition considered to be an "Indian doctor" worthy of special respect and protection.

(3) *xlitāwit* 'horned lizard'



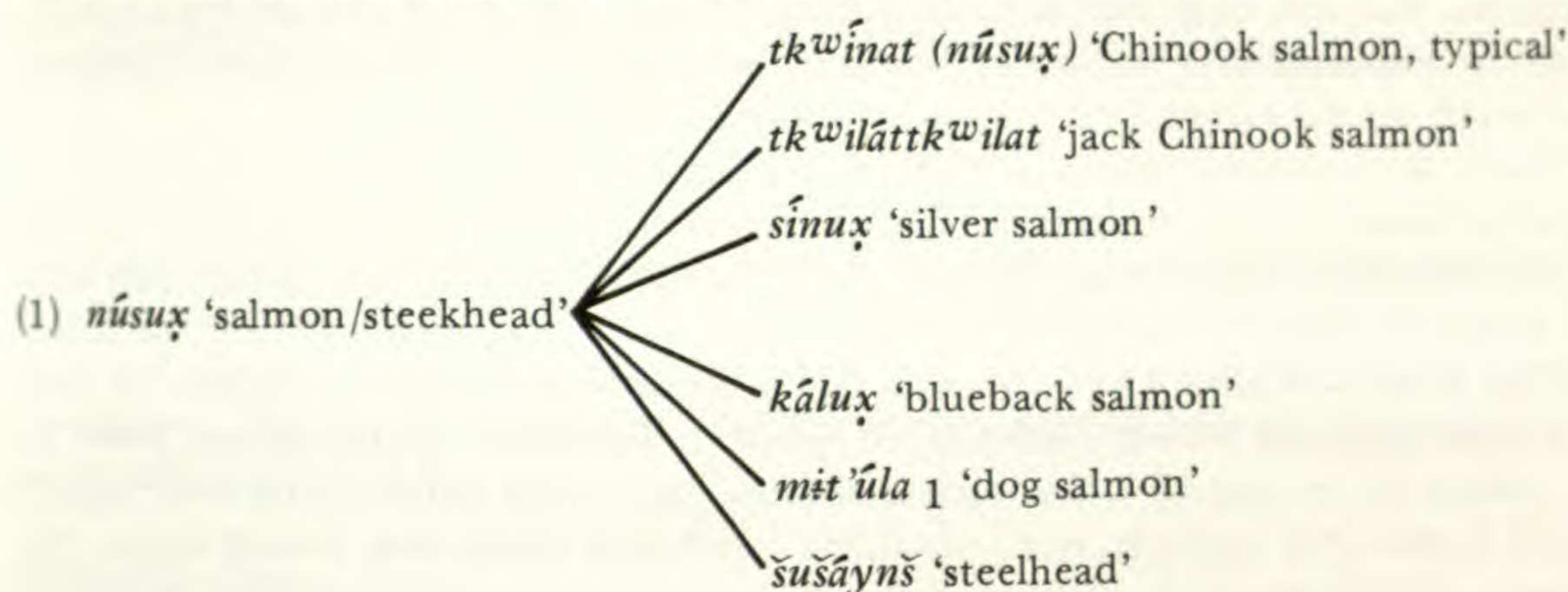
Typical snakes are called *pyūš*, with the abundant garter snakes (three species of *Thamnophis*) considered unexceptional examples. This name also may be applied unmodified to the racer (*Coluber constrictor*) and the gopher snake (*Pituophis melanoleucus*), two other common species. However, the gopher snake was named *nč'ī pyūš*, literally, 'big snake', by at least three consultants of as many dialects. Others apply a contrasting basic level term, *ppāw*, to this species (Johnson-O'Malley 1977), perhaps reflecting a more differentiated nomenclature before Euro-American settlement. Individual consultants have on occasion used additional binomials to distinguish garter snakes and racers, but such usages failed to meet our nomenclatural standard for consistency of application. The western rattlesnake (*Crotalus viridis*)—like the horned lizard, an "Indian doctor"—is not considered to be a kind of *pyūš*, though its name, *wāxpuš*, clearly suggests an etymological link with *pyūš* now obscure to native speakers. Thus 'snake', as we understand it, remains a covert category in Sahaptin.



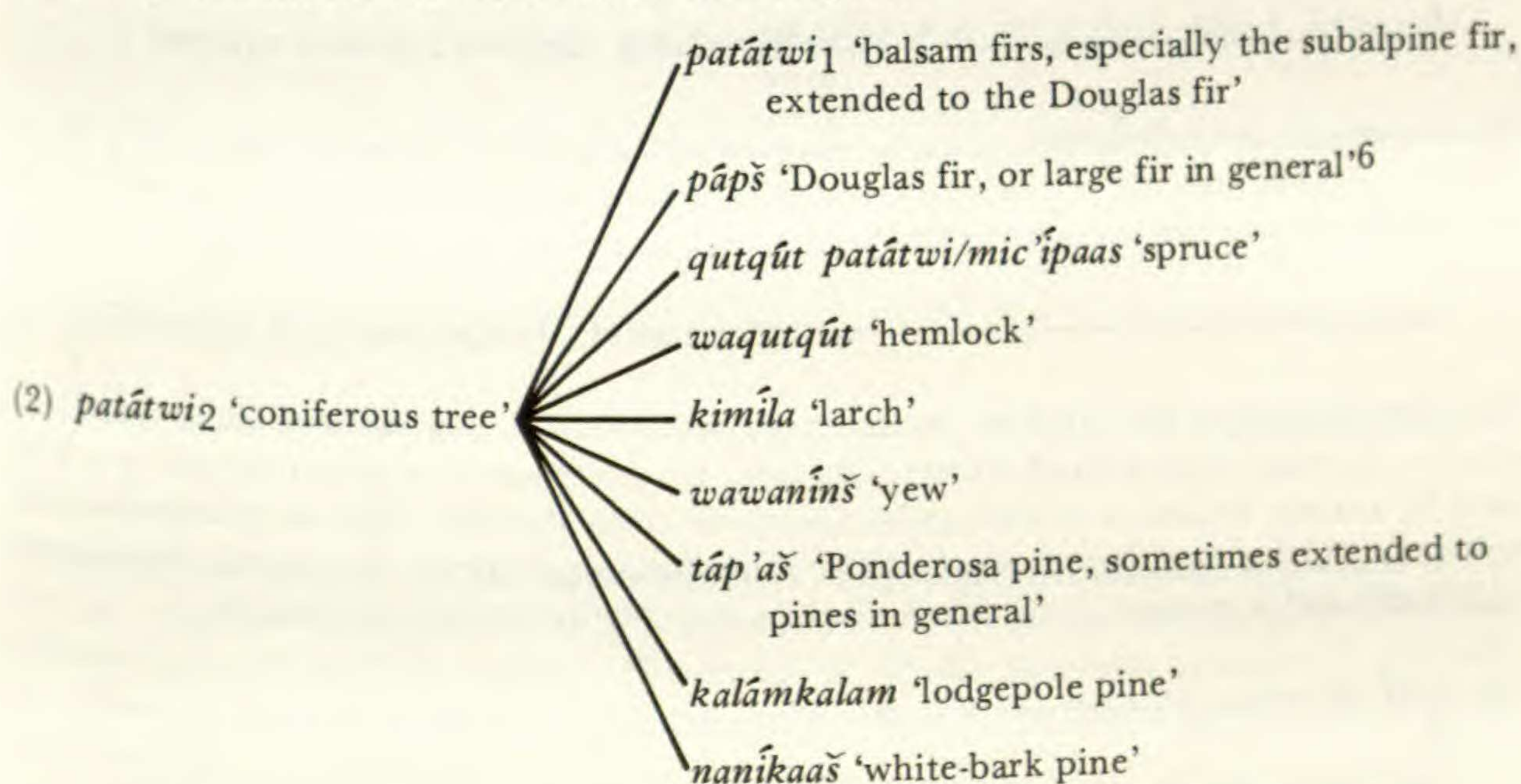
All four cases of binomial nomenclature among animals involve a minimal development of the specific contrast set. In three cases a binomial name is applied to one exceptional "species" within a folk "genus"—or possibly to a coordinate form in the case of the snowy owl—while the other member(s) of the genus is (are) not distinguished by a parallel binomial. Thus it would be necessary to postulate an unmarked polysemous type-specific category in three of four cases in order to preserve the hierarchic form of the taxonomic model.

Expressions of Binomial Form which are not Valid Specific Names.—Binomial names in which the head component of the name refers to a taxon superordinate to the basic level were not treated above (very few cases are known for Sahaptin). This accords with Berlin's distinction (1973:217) between "primary" names such as "mockingbird," which contrast with such names as "robin" (not "robinbird"), and "secondary" names, the true binomials, such as "bald eagle," which contrasts with "golden eagle," a name with parallel structure. One example of a "binomial name" at the basic level in Sahaptin is the form *tk^wnat nūsux* 'Chinook salmon', more usually and simply rendered *tk^winat* (for *Oncorhynchus tshawytscha*). The taxon *nūsux* 'anadromous salmonid' includes up to seven

basic level categories (Hunn 1979), but spontaneous binomial combinations have been recorded only for *tk^winat*, the prototype of *nūsux*.



The category *nūsux* may be considered a small "life form" (as there is no general term for 'fish' in Sahaptin) or a named intermediate level taxon (see Berlin, Breedlove, and Raven 1973), as it includes several basic level taxa. A similar situation holds among names for coniferous trees, at least as Sahaptin is spoken today. Spruce trees (*Picea engelmannii* Parry ex Engelm.) may be called *qutqūt patātwi* 'prickly fir'. However, *patātwi* also includes a number of trees known by primary names, e.g., *waqutqūt* 'hemlock', *tāp'aš* 'Ponderosa pine', and *naníkaaS* 'white-bark pine'. The occasional use of a primary name for spruce, *mic'īpaas*, literally, 'itchy tree/shrub', suggests that the binomial term is a recent replacement for the "true name" now forgotten.



More than 20 varieties of *k'ūsi* 'horse' are recognized nomenclaturally by contemporary consultants (a more exact count is not possible due to the productivity of binomial labeling used to describe horses). These varieties are labeled as in the following examples: *māamin* 'appaloosa', *kawxkāwx* 'palomino', *luč'ā* 'bay' (from *luč'ā* 'red'), and *wiwnuwāakuł* 'huckleberry roan' (literally 'huckleberry-like'). It is acceptable to say *māamin k'ūsi* 'appaloosa horse', but such a binomial variant is rarely noted in normal naming contexts or in conversation, even when the modifier is a widely used adjective such as *čmūk* 'black', which thus may also mean 'black horse', according to context. In a few instances there is a further subdivision of specific horse names into varieties which may be named binomially, as for example, *čmūk šiwīwšiwīw* 'black roan'. Sahaptin horse classification illustrates an unusual elaboration of Sahaptin nomenclature that is a con-

sequence of a recently introduced biological phenomenon, a domesticated, and thus extremely variable organism. We have thus excluded horse varietal terms from present consideration. The very large number of recognized horse varieties is also anomalous with respect to the expected distribution of polytypy (Geoghegan 1976), a pattern consistent with the recent incorporation of the horse in Sahaptin culture.

We have also excluded cases in which a heterogeneous basic level taxon is frequently but idiosyncratically or inconsistently further specified binomially. Examples include *ššáy* 'worm/caterpillar/maggot' and *kliwisá* 'ant'. Variation within these broad categories may be noted by reference to color, behavior, habitat, or host organism, but the forms seem clearly to be on-the-spot inventions to entertain the ethnographer. Finally, we have excluded cases involving recently introduced species. The binomial expression *tanán* X, literally 'Indian X', is used by a few consultants to distinguish native forms from related introduced forms. For example, one consultant contrasted *tanán ššák* 'Indian onion', the wild species of *Allium*, with *ššák* proper, which this consultant restricted to garden onions. Another individual referred to an ear of varicolored "Indian corn" as *tanán sit x'wswáakut*, literally 'Indian corn'. These usages, besides being recent, are idiosyncratic and sporadic.

The Suffix -wáakut '-like'.—This naming convention is much more frequently used in botanical names than in the zoological. Our single animal case is the ground squirrel example cited above.

- (1) *c'iitá* 'Townsend's/Washington ground squirrel'

_____ *c'iitawáakut* 'Belding's ground squirrel'

Plant examples are as follows:

- (2) *anipáš* 'Claytonia lanceolata Pursh'

_____ *anipašwáakut* 'Montia sibirica (L.) Howell'

The first named is an "Indian potato"; the second is a striking look-alike and close relative, lacking underground tubers. In fact, the presence of a tuberous root is a trait used by certain botanists to distinguish *Claytonia* from *Montia*. This use of *anipašwáakut* was recorded by Gunther during a 1935 ethnobotanical survey in western Washington (1973:29) and is current on the Warm Springs Reservation in eastern Oregon.

- (3) *č'iší* 'Purshia tridentata (Pursh) DC.'

_____ *č'išiwáakut* 'Cercocarpus ledifolius Nutt.'

Purshia and *Cercocarpus* are large shrubs or small trees of the rose family (Rosaceae). *Purshia* is widespread, while *Cercocarpus* is found only on the southeastern fringe of the Sahaptin range.

- (4) *nánk* 'Thuja plicata Donn.'

_____ *nankwáakut* 'Calocedrus decurrens (Torr.)
Florin.'

This Warm Springs case is precisely parallel to the preceding but involves two large tree

species of the cypress family (Cupressaceae); *Thuja* is common and widely used, while *Calocedrus* is known only from the southwestern corner of the Sahaptin range.

(5) *sáxi* 'Philadelphus lewisii Pursh'

_____ *saxiwáakut* 'Symphoricarpos albus (L.) Blake'

Here two shrubs, though not closely related, share the characteristic of opposite leaves. Both are common, widespread, and useful; *Philadelphus*, in the rose family, as a durable wood and source of soap; *Symphoricarpos*, in the honeysuckle family (Caprifoliaceae), as a medicine. The "junior status" of *Symphoricarpos* may be because of its shorter stature and smaller leaves and flowers.

(6) *suspân* 'Fragaria spp.'

_____ *suspanwáakut* 'Geum triflorum Pursh'

Here the strawberry (*Fragaria*) is compared to another herbaceous species of the same family (Rosaceae). The strawberry is a favorite though incidentally important food; *Geum triflorum* is used medicinally.

(7) *tawšá* 'Artemisia tridentata Nutt.', 'big sagebrush' in part,

_____ *tawšawáakut* "'A. vaseyana," a montane ecotype of *A. tridentata*, and *A. arbuscula* Nutt.'

Tawšá is abundant at lower elevations, occasionally attaining the stature of a small tree. It has incidental technological applications and is a medicine. *Tawšawáakut* is a form dwarfed by high elevation ("*A. vaseyana*") or impoverished soils (*A. arbuscula*).

(8) *tmîš* 'Prunus virginiana L.'

_____ *tmîšwáakut* '*P. emarginata* (Dougl.) Walp. and domestic *P. cerasus* L., etc.'

The conceptual priority of the chokecherry (*P. virginiana*) presumably is because of its value as a highly regarded food. Bitter cherry (*P. emarginata*) is not eaten here but has technological and medicine value. The inclusion of the domestic cherries (*P. cerasus*, etc.) gives the derived category a residual quality, that is, we might gloss *tmîšwáakut* as 'any cherry but the chokecherry'.

(9) *wák'amu* 'Camassia quamash (Pursh) Greene'

_____ *wak'amuwáakut* '*Iris missouriensis* Nutt.'

Camas (*Camassia*), in the Liliaceae, is a staple root food while the iris, Iridaceae, is not used. Both are showy monocots with grass-like leaves.

The terms for corn and tomatoes provide two additional examples of the use of plant names modified in this way. Both are introduced domesticates, though corn may have been known to Sahaptins before Euro-American contact. Corn is almost universally known as *sit'xwswáakut*; its namesake *sit'xws* is *Brodiaea hyacinthina* (Lindl.) Baker in the lily family, valued for its edible corms. The resemblance perceived, however, is

not between corn and the lily *as plants*, but in the form of the edible portions of each, the kernel of corn fancied to resemble the corm of the *Brodiaea*. Our second example is precisely comparable. The introduced tomato is often called *šč'apawāakut* 'rosehip-like', and indeed a tomato's fruit bears a substantial superficial resemblance to the fruit (hip) of the native roses. These two cases are intermediate between the instances described above in which two taxa are closely related conceptually on the basis of overall morphological resemblance, and instances in which the perceived resemblance is based on some single characteristic shared by the "prototype" and the form compared to it, as when a "huckleberry roan" is called *wiwnuwāakut* 'huckleberry-like' based on shared color.

Reduplication.—This naming pattern is less frequent than the preceding, but it is used in the same way to link a simply named prototype to a derivatively named form (or forms) perceived to be closely related. It usually carries the additional implication of relatively smaller size. Botanical examples include the huckleberry case already cited:

- (1) *wiwnu* 'Vaccinium membranaceum Dougl. ex Hook'

_____ *wiwlūwiwlu* 'V. scoparium Leiberg'

The prototype in this case is a highly valued staple food; *V. scoparium* is also eaten, but more as an incidental treat. Both the shrub and fruit of *V. scoparium* are dwarfed. In some Sahaptin dialects taller native onions are called *šāak*, while low-growing species are *saaksāak*:

- (2) *šāak* 'taller wild onions'

_____ *saaksāak* 'low-growing wild onions'

A similar (or identical?) contrast is handled differently in other dialects, in which the taller onions of wet meadows are called *q^wlāwi* and the low-growing rock onions are *sāmamwi*.

Zoological examples include the following:

- (3) *tk^wīnat* 'typical *Oncorhynchus tshawytscha*'

_____ *tk^wilāttk^wilat* "'jack" *Oncorhynchus tshawytscha*'

The "jack" of the Chinook salmon is a form of that species that returns to spawn a year earlier than is typical. They are identifiable by their smaller size. The "jack" is not considered a kind of *tk^wīnat*, but a "species" of salmon in its own right. The next two cases are close parallels.

- (4) *apīn* 'head louse'

_____ *apīlapīl* 'small swarming invertebrates'

Examples of the latter include aphids and the larvae of mosquitoes.

- (5) *īšt^xnī* 'horse fly, typically, extended to include other large biting flies'

_____ *īšt^xlīīšt^xli* 'gnats'

Our final example is the intriguing case of the horse and dog. Contemporary Sahaptin speakers, as well as those who served as Pandosy's informants (1862), call the dog *k'usi-k'usi*, literally 'little horse'. However, the horse is the more recent introduction (Haines 1938). Dogs are known from the Pacific Northwest archaeologically since 10,400 BP (Lawrence 1968), and thus must have been the original referent of *k'usi*. Horses were likened to dogs presumably because of the role they came to play in human social economy as highly useful and esteemed (but inedible) pets. The horse's large size and rapid incorporation as an essential mode of transport and currency of social exchange apparently produced the semantic shift now evident:

(6) *k'usi* 'horse'

└────────────────────────────────── *k'usik'usi* 'dog'

A similar process occurred in Tzeltal with deer and sheep and peccaries and pigs (Berlin 1972:82-83).

We have not counted here cases of reduplication used to name early growth stages of a plant or animal, such as *aluqataluqat* 'recently emerged frog/toad', from *aluqat* 'adult frog', and *tap'aytap'ay* 'Ponderosa pine seedling', from *tap'aš* 'Ponderosa pine'. We have not counted *lalíklalik* 'columbine' (*Aquilegia formosa* Fisch.), derived from *naník* 'seed of white-bark pine', as the resemblance is drawn between the seeds of the respective plants only, a naming pattern like that of corn and tomato.

Implicit Recognition of Prototype/Satellite Structural Relations.—The coordinate relationship between a prototypical category and one or more satellite taxa—explicitly recognized in the above examples by reduplication or the suffix *-wáakut* 'like'—is frequently implicit in Sahaptin. Such implicit relationships are manifested by consultants' statements that taxon *X* is similar or related to taxon *Y* or by patterns of identification errors (Hays 1976). In each of the following cases a heterogeneous basic level taxon has a closely associated satellite taxon which—if not named in its own right—would be subsumed by the heterogeneous category as within the "sphere of influence" of the prototype (cf. Bright and Bright 1965).

(1) *xatxat* 'duck in general with the mallard prototypical', except for,

└────────── *táštáš* 'common merganser'

(2) *pyúš* 'snake in general with variable focus', except for,

└────────── *wáxpúš* 'rattlesnake'

(3) *watik'ásas* 'lizard in general with *Sceloporus/Uta* apparently prototypical', except for,

└────────── *t'uulnawatá* 'unidentified lizard'⁵

(4) *kliwisá* 'ant in general with *Formica* spp. prototypical', except for,

└────────── *támšuy* 'a species of small, non-biting, black ant'

(5) *wixalxali* 'spider in general with no apparent prototype', except for,

└────────── *tíšpun* 'black widow spider', and

└────────── *káatlam wuxá* 'harvestman', literally 'long-leg'

- (6) *ttāxš* 'willow in general with no apparent prototype', except for,

└─ *babāw* 'peachleaf willow'

The rattlesnake and black widow spider are significant dangers; the peachleaf willow, due to its atypical growth form, is of special utility; while the common merganser warned Columbia River villagers of the approach of Paiute Indian raiders. In these cases the special utility of the satellite taxon seems of paramount significance in motivating its special recognition. Morphological singularity seems the dominant factor in the cases of *t'uulnawatā* and the harvestman. Why *tāmšuy* is deemed worthy of special attention remains a mystery.

DISCUSSION

We have examined 21 legitimate cases (and a number of marginal ones) in which pairs of taxa conceived to be related are linked nomenclaturally. In all cases the pattern is similar: the prototypical taxon provides the nomenclatural base for naming the peripheral relative. This pattern is obvious in the cases of reduplication (N=6) and in the use of the suffix *-wāakut* 'like' (N=9). It is somewhat less clear in the binomially labeled cases (N=6). However, at least in the case of the snowy owl the binomial *qūyṣ miimānu* carries no implication of taxonomic subordination to the unmarked prototype, *miimānu* 'great horned owl'. Thus at least 16 of 21 (76%) of these cases of indirect naming involve conceptual *coordination* between basic level taxa, one focal, the other peripheral, rather than hierarchic *subordination* between taxa at higher and lower levels or ranks of a taxonomy.

Sahaptin also contrasts with other cases cited in the literature in terms of the extent to which indirect naming of any sort is used. The percentage of taxa named by reference to other taxa, either by reference to a superordinate taxon or a coordinate, prototypical taxon, is 5%, compared to ca. 35% *binomially* named taxa in Tzeltal (Berlin, Breedlove, and Raven 1974:37; Hunn 1977:79). Thus, not only do Sahaptin speakers avoid subordinating one taxon to another nomenclaturally, but they also are less given to naming one taxon in terms of another. A related observation is that Sahaptin consultants are skeptical of "names" which are transparently descriptive of either form or function. For example, thistles (*Cirsium* spp.) are always referred to as *qutqūt*, literally 'thorny'. In the same breath, consultants aver that *qutqūt* is not the plant's "real name." No consultant has been able to recall what the "real name" is, but all agree it is not *qutqūt* and that a "real name" does in fact exist. Consultants react similarly to the label *tutanikpamā*, literally 'for the hair', applied to a variety of plants used "medicinally" to make their hair grow long or to prevent graying. By contrast, Tzeltal speakers freely accept names of the form 'X-medicine'. This Sahaptin naming style may reflect a belief in the essential power of names. Naming ceremonies and the inheritance of ancestral names is a focal point of Sahaptin ritual observance even today. However, it is not clear that Sahaptin speakers differ in their regard for the sacred power of names from speakers of languages which use indirect naming more freely. Such a connection should be investigated.

The Sahaptin nomenclatural pattern we have described may be interpreted in several ways. These interpretations might be of three types, the pattern being: (1) illusory, (2) stylistic, or (3) evolutionary. Those who argue for the pattern as illusion might assert that the Sahaptin data are the result of a degenerative process due to acculturation. Perhaps the pre-contact Sahaptin system more closely resembled the Tzeltal, Ndumba, Aguaruna, or Hanunóo systems in reliance on binomial naming. The restricted Sahaptin ethnobiological inventory, i.e., 450 Sahaptin basic level taxa versus 571 in Ndumba, 813 in Tzeltal, 1000+ in Aguaruna, and 1000+ in Hanunóo, might suggest that the presently

accessible inventory is significantly less than it once was. If acculturative losses disproportionately affect productive lexemes, we should expect acculturated systems to exhibit a smaller percentage of binomial names than fully viable systems.

We do not believe acculturative loss explains the Sahaptin data. First, though it is likely the pre-contact system was larger, it is doubtful that it was ever as large as the comparison systems for the basic reason that the ecosystems familiar to the Sahaptin people are less rich in species than those of the Tzeltal, Ndumba, Aguaruna, or Hanunóo, all in humid, tropical environments. Furthermore, there is continued nomenclatural recognition of some very similar and closely related species, as those of the genus *Lomatium* (Hunn and French 1981). Although one might expect binomials to be applied to such cases, they are not. We call attention also to the fact that in many languages binomials are most frequently employed in naming species of high cultural salience (Berlin, Breedlove, and Raven 1973:216). Such names are likely to be disproportionately persistent under acculturation. Finally, we note that in several instances binomials and other productive lexemes have recently replaced unanalyzable linguistic expressions in Sahaptin nomenclature as in the examples cited of *qutqút patátwi* 'spruce' and *nč'í pyúš* 'gopher snake'. Thus indirect naming may be more frequent in contemporary Sahaptin than it was pre-contact.

It may be argued that patterns of naming simply reflect styles peculiar to the "genius" of one language or another. We may appreciate such variation as illustrating the rich diversity of human cultures, but draw no more general conclusions. For example, French (1960) has documented dramatic differences in naming responses between samples of native speakers of Sahaptin, Upper Chinookan, and English to standardized collections of plants. Sahaptin speakers much more frequently labeled unfamiliar plants with nonce forms indicating perceived relationship or similarity, i.e., of the form *X-wáakut* 'like-X', while Upper Chinookan speakers simply said, "I don't know."⁸ English speakers were particularly inclined to invent names or to subsume unfamiliar plants within known categories. However, if the predilection for the use of binomial names were purely stylistic, Berlin's universals could not be relied upon (1973). The consistency with which binomials are applied for example in Tzeltal, Ndumba, Aguaruna, and Hanunóo, is strong contrary evidence. It is also noteworthy that published excerpts from languages such as Eskimo (Irving 1953), Groote Eylandt (Waddy 1982), Agta (Headland 1983), and Khoisan (Lee 1979:464-478) suggest that these languages might closely resemble Sahaptin in their disuse of binomials. It is at least suggestive that the former set of languages are of subsistence farmers, the latter of hunter-gatherers. This brings us to our third alternative type of explanation.

Evolutionary explanations of this nomenclatural pattern may be of three basic types, reflecting the evolution of: (1) intellectual capacities, (2) social organization, or (3) ecological and economic systems. There are respectable proponents of each of these evolutionary perspectives. For example, Berlin (1972) argues that folk biological classification systems evolve in two steps; the initial step is one of "horizontal" expansion of the set of basic folk taxa by an analogical process of "concrete transposition." What we have labeled *coordination* here is an example. The subsequent evolutionary step—which complements but does not supplant the first—is one of "vertical" expansion from the basic folk taxa by means of generalization to produce named life-forms and, ultimately, the unique beginner, and of differentiation, to produce folk specific and varietal taxa. Binomial names are indicative of this latter process. From this perspective *subordination* is a superior mode of classification, being more "abstract" than coordination. We believe this assessment has no basis in fact, but rather represents the bias of speakers of a language, English, that has enshrined binomial nomenclature as the scientific ideal. To recognize that *X* is like *Y* requires abstraction fully as much as to recognize that *X* is a kind of *Y*.

Durkheim and Mauss argued in *Primitive Classification* (1963) that the conceptual recognition of hierarchy, as in a taxonomy, is a byproduct of the experience of social hierarchy. Thus one might argue that Sahaptin folk classification lacks hierarchical development comparable to that of the Tzeltal because the pre-contact Sahaptin speakers were egalitarian hunter-gatherers within an acephalous polity, while the Tzeltal Mayans had long known the reality of state and nation. This hypothesis is tempting in that Sahaptin social relations stress coordination and do not emphasize subordination. Though chiefs (*miyāwax*) were recognized, their power was limited. Much more salient were bilateral kin ties and dyadic trading partnerships between 'friends' (cf. Marshall 1977). There is a curious parallel between the Sahaptin stress on individual autonomy and their stress on the essential uniqueness of plant and animal names. However, it is patently false that Hanunóo—which surpasses Tzeltal in degree of taxonomic hierarchy in the folk biological domains as far as Tzeltal surpasses Sahaptin—have experienced extremes of social hierarchy. Furthermore, the Wasco/Wishram place considerably greater stress on social hierarchy than do their Columbia River Sahaptin neighbors, yet share their aversion to hierarchy in their folk biological classifications. It seems the apparent correlation of taxonomic hierarchy with social hierarchy may be an epiphenomenon of the underlying subsistence systems. This brings us to a consideration of the third evolutionary perspective, the ecological.

The pattern we have observed here suggests that folk biological classification systems have evolved from a single-tiered system of coordinate taxa among hunter-gatherers to a multi-tiered system (a taxonomic hierarchy proper) exhibiting a high incidence of basic level polytypy (Geoghegan 1976) among subsistence agriculturalists. A further stage of development (or of devolution, if you will) has been suggested (Dougherty 1978, Brown 1979) to account for the progressive increase in the number of highly inclusive morphologically based life-form categories and parallel reduction in numbers of basic level taxa. The initial phase of this evolutionary pattern might be explained by reference to the process of domestication. Diverse cultivars might reasonably have been the initial recipients of binomial names. They are very commonly applied in such instances. However, many wild plants and animals are also so named. Therefore, we must assume a process of generalization whereby binomial naming was extended to wild relatives of cultivated plants and animals, then used to label any closely similar set of plants or animals, domesticated or wild. The fact that the degree of polytypy among Tzeltal zoological terms is virtually identical to that of Tzeltal botanical terms—despite the far greater role of domesticated plants than of animals in Mayan subsistence—indicates that this hypothetical process has run its course in Tzeltal.

This is a plausible account but an incomplete explanation. There remains to be explained the apparent correlation of the degree of polytypy and the size of the folk biological inventory (Table 1). Independent of the domestication of plants and animals, an elaboration of taxonomic hierarchy might serve as a more efficient means to mentally store a larger quantity of folk biological knowledge. It is presumably easier to learn and to remember a set of five terms—one naming a basic level taxon and the others naming binomially labeled subdivisions, such as pine, Ponderosa pine, white pine, lodgepole pine, and white-bark pine—than to learn the unrelated names of four genera—as in Sahaptin, *tāp'aš* 'Ponderosa pine', *pak'inākaas* 'white pine', *kalāmkalam* 'lodgepole pine', and *nanīkaaš* 'white-bark pine'. Thus we might expect the use of binomials to increase rapidly beyond a certain threshold of basic level name expansion, and to continue to increase in proportion to the size of the total inventory of basic level terms. Such an interpretation fits the data of Table 1. However, we have not explained the expansion of knowledge which, by this hypothesis, gives rise to the increase in binomial naming. In fact, we might have predicted quite the opposite, that is, that hunter-gatherers should have the largest folk biological inventories, subsistence agriculturalists the next largest,

with modern urban dwellers having the smallest, in relation to the degree to which each system depends upon detailed, widely-shared knowledge of natural history. Thus binomial nomenclature, if functionally linked to the scope of a folk biological domain as hypothesized above, should be inversely correlated with this progression of modes of production. This seems not to be the case.

We would like to propose a possible resolution of this seeming contradiction. First, we believe it likely that hunter-gatherers will have smaller folk biological inventories than subsistence farmers in the same habitat. This accords with an otherwise curious fact that Kalahari San hunter-gatherers are *more selective* of the plants they use than nearby agricultural Bantu (Lee 1979:180). They can afford to be more selective because of their low population densities and high mobility. Subsistence farmers are subject to periodic crop failures (Colson 1979), at which times they are forced to rely on wild foods the hunting-gathering San consider inedible. Their sheer numbers force them to recognize a wider range of species as of potential use than is true of the San. If this hypothesis is correct, the increased reliance on binomial naming by agriculturalists may be understood as a response to the need for an expanded ethnobiological repertoire. Brown (1984) has recently arrived at precisely this conclusion on the basis of an extensive series of cross-language comparisons.

Subsequent industrialization and urbanization reduces the need for detailed knowledge of natural species among the general population. As a consequence, the sweeping generality of life-form categories proves adequate in most circumstances. Binomial nomenclature, however, does not disappear, since the *cultivars* frequently so named remain important. Thus the elaborate taxonomic hierarchy proposed by Berlin as the ultimate expression of our evolving capacity to comprehend natural diversity is seen rather to result from a sequence of economic developments affecting our *need to know* aspects of that natural diversity (cf. Hunn 1982).

ACKNOWLEDGEMENTS

E. Hunn's research has been supported by NSF Grant BNS7616914 and by grants from the Melville and Elizabeth Jacobs Research Fund. D. French's research has been supported in part by a PHS research grant, GM-11287, from the National Institute of General Medical Sciences. Student assistance was supported by grants to Reed College under the Shell Assists program and the National Science Foundation (GY-4746, GU-3364). French would like to thank the Wenner-Gren Foundation, Carl N. Reynolds, the Social Science Research Council, and the American Philosophical Society for earlier aid, and Nancy Fowler and Kathrine S. French for a critical reading of the manuscript. Terence E. Hays and Paul M. Taylor provided most helpful critical comments. This work would not have been possible without the generous instruction, advice, and encouragement of our Sahaptin-speaking consultants. We dedicate our efforts to honoring their cultural achievements.

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NOTES

- ¹ Earlier versions of this paper were presented by Hunn to the 5th Annual Ethnobiology Conference in San Diego, California, April 1982, and by Hunn and French to the 17th International Conference on Salish and Neighboring Languages in Portland, Oregon, August 1982. The Sahaptin examples cited are primarily from Hunn's John Day and Umatilla data. French's Warm Springs Sahaptin data differ in detail but are supportive of all key conclusions.
- ² Sahaptin words are written in a phonemic orthography adapted from Rigby (n.d.) as follows: plain stops, and affricates are *p, t, c, ʈ, ʧ, k, kʷ, q, qʷ*; glottalized stops and affricates are *p', t', c', ʈ', ʧ', k', kʷ', q', qʷ'*; spirants are *s, ʃ, x, xʷ, ɣ, ɣʷ*; sonorants are *m, n, l, w, y*; laryngeals are *h, ʔ*; and vowels are *i, ü, é, u, uu, a, aa*.
- ³ For some consultants *wiwlúwiwlu* refers instead to a wild blueberry, *Vaccinium caespitosum* Michx.
- ⁴ In Northwest Sahaptin dialects *twini'* 'tail' replaces *uát was*. Some speakers prefer *qúyx* 'white, animate' to *plás* 'white, inanimate'.
- ⁵ Our consultants are unsure as to the characteristics of *t'uulnawaká* agreeing that it is a snake-like lizard that 'jumps'. Some informants may apply the term to alligator lizards (two species of *Gerhonotus*); others may have in mind the rare and local western whiptail (*Cnemidophorus occidentalis*).
- ⁶ Contemporary consultants assert the *páps* is equivalent to very large individuals of *Pseudotsuga* or *Abies*, while *patátwi* refers to all others of these genera. This seems unlikely to represent the original classificatory situation and contradicts some facts of the contemporary situation, most notably

the fact that *patátwi* very clearly implies a prototype with the characteristics of *Abies*, to wit, highly aromatic foliage. This characteristic—and important uses contingent upon it—are not cited for *pápā*.

⁷ For some speakers the iris is *nunaswáaku t*, named after the mariposa lily *Calochortus macrocarpus* Dougl. The classificatory principle is the same, as *C. macrocarpus* is a valued winter emergency ration.

⁸ A form functionally parallel to Sahaptin *-wáaku t* ‘-like’ is used by speakers of the Wasco dialect of Upper Chinookan, but only to *describe*, not to *name* categories.

⁹ This term was not cited in previous discussions of Sahaptin tree terms as it is apparently restricted today to the Northwest dialects.